

REMARKS

Applicants have been amended the specification and claims in order to more particularly define the invention taking into consideration the outstanding Official Action. The amendments are all clearly supported by the original specification.

The objection under 37 CFR 1.75(d)(1) set forth in item 3 on page 3 of the Official Action is respectfully traversed on the grounds that:

- The claimed term "a plurality of PAC signals" is described on page 6 in the original specification (which describes PAC signals).
- The claimed term "a plurality of coupling voltage" is clearly supported by step S502 shown in Fig. 5 of the original specification.
- The claimed terms "a predetermined value" and "an inner product operation" are clearly described in the first paragraph of the description.
- The claimed term "an adder" is described in the last paragraphs on page 6 and the first paragraph on page 8.
- The claimed term "a polarity inverting unit" is canceled, and the associated claims 5 and 9 are also canceled.

The **objection to the drawings** has been addressed by amending the specification to mention the reference characters listed in item 2 of the Official Action and shown in Figs. 4 and 6.

Reconsideration of this application is respectfully requested in view of the foregoing amendments and the following remarks.

Response to Rejections Under 35 U.S.C. § 102

The rejection of claims 1-12 is under 35 U.S.C. § 102(e) as being anticipated by Takeda et al. (U.S. Patent No. 7,027,025) is respectfully traversed on the grounds that the Takeda patent fails to disclose or suggest a timing generator, as claimed, that arranges the polarities on a frame based on the sum of coupling voltages or the sums of all the polarity data vectors, i.e., outputting the corresponding PAC signal with the sum of coupling voltages smaller than a predetermined value or the smallest sum among the sums of all the polarity data vectors. Instead, Takeda teaches accumulating and subtracting the signal levels of pixel data for odd-numbered lines and even-numbered lines to generate an alternation signal for changing the voltage polarity applied to a liquid crystal layer. Takeda therefore does not teach the timer of the claimed invention.

The applicant wants to emphasize that, in the present invention, a plurality of sets of polarity data and a plurality of corresponding PAC signals are stored in advance, and then an operation is performed with respect to one set of polarity data and the display data for obtaining a corresponding sum of coupling voltages. The sum of coupling voltages of one set of polarity data is compared with a predetermined value, and if the sum of coupling voltages of one set of polarity data is smaller than the predetermined value, the corresponding PAC signal of the polarity data is outputted to the data driver; or the sums of coupling voltages of the sets of polarity data are compared with each other so as to choose the polarity data

having a smallest sum of coupling voltages and the corresponding PAC signal for output), thereby obtaining an optimum polarity arrangement, decreasing cross-talk, and improving display quality.

In contrast, the Takeda patent discloses a liquid crystal display device having a plurality of pixels arranged in the form of a matrix, with groups of the pixels being arranged in lines along respective gate signal lines. Takeda provides for accumulating both signal levels of pixel data for odd-numbered lines of the pixels and for even-numbered lines of the pixels separately in every frame period, obtaining a subtracted value obtained by subtracting one of the accumulated values of the signal levels from the other, and transmitting an alternation signal which changes the voltage polarity applied to a liquid crystal layer by modifying the phase thereof on the basis of the subtracted value. As a result, it can be seen that Takeda tries to suppress flicker appearing on a display screen primarily by accumulating and subtracting the signal levels of pixel data for odd-numbered lines and even-numbered lines to generate an alternation signal for changing the voltage polarity applied to a liquid crystal layer. Such a technique is different from the inventive feature of arranging the polarities on a frame based on the sum of coupling voltages or the sums of all the polarity data vectors, i.e., outputting the corresponding PAC signal with the sum of coupling voltages smaller than a predetermined value or the smallest sum among the sums of all the polarity data vectors. Instead of teaching the claimed invention, the control signal generation of Takeda actually resembles the "Related Art" described in the background section of the present application. Whereas the polarity arrangement for a frame according to the invention can be aperiodic (FIG. 4 and associated description),

Takeda requires that the polarity arrangement be periodic (FIGS. 5, 6 and associated description).

The Examiner has alleged that element 102 (serial/parallel conversion) of Takeda is analogous to the storage unit of the invention. In reply, the applicant respectfully notes that the serial/parallel conversion 102 of Takeda is provided for receiving inputted display data 101 and classifying the display data into pixel data of odd-numbered lines and pixel data of even-numbered lines (column 6, lines 51-59), instead of storing a plurality of sets of polarity data and a plurality of PAC signals. Thus, it is clear that the serial/parallel conversion of Takeda is different from the storage unit of the invention.

Further, the accumulator A103 and register A105 of Takeda are provided to accumulate and temporarily store signal levels of pixel data for odd-numbered lines of the pixels, and the accumulator B104 and register B106 are provided to accumulate and temporarily store signal levels of pixel data for even-numbered lines of the pixels (column 7, lines 17-25). Thus, these elements A103, A105, B104 and B106 are used to obtain signal levels by simply accumulating them, which is different from the operation unit of the invention which receives the display data, the plurality of sets of polarity data, and a corresponding one of the PAC signals to perform an inner product operation for obtaining a sum of a plurality of coupling voltages corresponding to the polarity data of each set of polarity data.

The Examiner alleges that Takeda further teaches that operation unit comprises an adder 152 for performing an inner product operation with respect to each set of polarity data (figure 8). However, adder 152 is actually provided to add respective outputs from the respective gray scale registers and outputs a signal corresponding to the

added value (column 10, lines 13-15), but not to perform any inner product operation.

Furthermore, the subtracter 107 of Takeda is provided to perform a subtraction between the accumulated value stored in the register A105 and the accumulated value stored in the register B106 to output an alternation selector signal 116 when the subtracted value becomes equal to or more than a reference value (column 7, lines 40-48). As the subtracted value is representative of difference between accumulated signal levels of odd- and even-numbered lines of pixels, and is totally different from the sum of coupling voltages, which is to be compared with a predetermined value by the comparison unit of the invention, it is clear that the subtracter of Takeda is also different from the comparison unit of the invention.

Therefore, the invention is not anticipated by the cited reference and withdrawal of the rejection of claims 1-12 in view of the Takeda patent is respectfully requested.

CONCLUSION

In view of the foregoing remarks, reconsideration and allowance of the application are now believed to be in order, and such action is hereby solicited. If any points remain in issue that the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the telephone number listed below.

Respectfully submitted,

BACON & THOMAS, PLLC

A handwritten signature in black ink, appearing to read 'Benjamin E. Urcia', with a long horizontal flourish extending to the right.

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